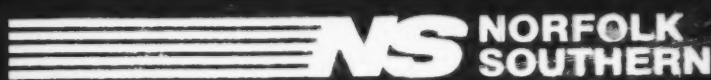


November 1983

RAILWAY AGE

...for the new age of railways

Baltimore Metro:
Worth waiting for



A winning combination

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TOFC/COFC: Setting the pace for recovery

How to stretch your drainage dollars

RAILWAY AGE

...for the new age of railways



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The consolidation of Southern and Norfolk & Western, which was carefully planned to minimize difficulties, is progressing ahead of schedule.

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As piggyback evolves into a major profit-maker, railroads are reconfiguring their terminals to accommodate it. Meanwhile new equipment keeps coming out.

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The first section of Baltimore's Metro is finished. Maryland MTA is fully prepared to begin operations Nov. 21, and no problems are expected.

66 Suppliers ante up to tell the railroad story

Railroad suppliers, through the five-year-old American Railroad Foundation, are supporting the effort to increase public awareness of the new railroads.



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Inside

Some good news for builders...

On Oct. 14, 167,774 serviceable freight cars were still in storage, waiting for loads. But not one of them was a Trailer Train piggyback car. On Oct. 6, all serviceable Trailer Train TOFC/COFC cars were on the road working—the first time that has happened since November 1979. That statistic becomes all the more impressive when you consider that over the last five



LUTHER S. MILLER

years, the utilization of Trailer Train intermodal equipment has increased from 165 miles per car day to 205 miles, as Senior Editor Gus Welty notes in our cover story (p. 44).

It is not surprising, then, that Trailer Train has some major equipment acquisition plans. TT proposes to buy 2,000 piggyback platforms next year, 3,000 in each of the three following years, and 4,000 in 1988—good news for those builders who have been investing their R&D money in new intermodal designs (or at least for those whose designs survive the shakeout that is now under way).

...and some not-so-good news.

For builders of other types of freight equipment, the news continues to be bleak. The car-surplus figure of a couple of weeks ago is a big improvement over that of ten months ago, when more than 300,000 cars lay idle. But most railroads still have more than enough cars to meet their needs, and no enormous upturn in orders is seen for another year or so.

At the RPI's 75th annual meeting in Washington Oct. 20, four railroad chiefs were asked during a meet-the-press panel about their 1984 capital-spending plans. Burlington Northern's Walter A. Drexel said BN, which maintained a large capital program this year, would have an equally large one in 1984—but it would be earmarked mostly for fixed plant. Southern Pacific's Denman K. McNear observed that SP's 1983 program was bigger than 1982's and 1984's would be bigger than 1983's—but again the big dollars would go into roadway and other fixed facilities. Harold H. Hall made it a thrice-told tale: Norfolk Southern's 1984 budget, he said, would be bigger than that of 1983—but comparatively little would go for rolling stock. Grand Trunk's John H. Burdakin said GT's '84 budget would be about the same as this year's—but it would contain little if anything for rolling stock.

Harold Hall did make the point that carbuilders should not be overly discouraged by all of those cars in storage; many of them, he said, are going to stay there and will need replacing. He also suggested that as more carrier/shipper contracts are negotiated, a new market may develop for specialty cars.

Market Outlook

Facilities

Burlington Northern: Is installing new MIR-6 microwave radios between Mendota, Ill., and Lincoln, Neb. The equipment was provided by Rockwell's Collins Transmission Systems Division under a \$660,000 contract.

Union Pacific System: Will build a new motor-vehicle unloading facility on Missouri Pacific at Westfield, Tex., north of Houston. The six-track ramp will accommodate 60 multilevel autorack cars; three self-propelled multilevel unloading machines and an A-frame will be used in the operation. In addition, the 75-acre facility will have parking space for 2,520 motor vehicles and 41 ramp spots for loading vehicles onto haulaway rigs.

Washington Metropolitan Area Transportation Authority: General Railway Signal is the apparent low bidder at \$3.7 million for signaling WMATA's new West Falls Church Yard, a multi-track rapid transit car storage and repair facility. Shipment of equipment is scheduled for late next year.

Equipment

American President Lines: Ordered 315 well platforms (63 five-unit intermodal cars) for double stacking from Budd. Deliveries are to be completed by next May.

Intermountain Power Agency: Awarded a contract valued at \$8.8 million to Ortner Freight Car Co. for the supply of 182 Rapid Discharge coal cars. The contract includes options to purchase additional cars, and to specify aluminum rather than steel construction. The cars will be assembled into two unit trains for moving coal from IPA's several Utah mines to the new Intermountain Generating Station now under construction near Delta, Utah. The first train is to be delivered in December 1984 and the second two years later.

Long Island: Is installing, in its fleet of diesel-hauled coaches, new seats de-

Freight cars and locomotives

	DELIVERED		July 1983	Eight months 1983	
	1983	1982		1983	1982
Built new by carbuilders	469	992	260	3,016	12,973
Built new in RR shops	0	68	0	200	1,054
Built new—total	469	1,060	260	3,216	14,027
Rebuilt	71	98	29	100	900
TOTAL DELIVERED	540	1,158	289	3,316	14,927
Locomotives (new and rebuilt)	22	25	11	158	322
ORDERED					
To be built new by carbuilders	287	373	934	3,748	5,175
To be built new in RR shops	0	0	0	3	0
To be built new—total	287	373	934	3,751	5,175
To be rebuilt	0	0	0	100	0
TOTAL ORDERED	287	373	934	3,851	5,175
ON ORDER AND UNDELIVERED					
	September 1		August 1	Average Backlog	
	1983	1982		1983	1982
To be built new by carbuilders	3,752	6,217	3,894	4,173	9,463
To be built new in RR shops	3	612	3	34	931
To be built new—total	3,755	6,829	3,897	4,207	10,394
To be rebuilt	0	0	71	34	352
TOTAL ON ORDER	3,755	6,829	3,968	4,241	10,746
Locomotives (new and rebuilt)	157	101	167	116	173

Source: Transportation Division, AAR

signed and supplied by Coach and Car Equipment under a \$4.8-million contract.

Santa Clara County Transportation Agency: Ordered 50 light rail cars from Urban Transit Development Corp. of Toronto at a total cost of \$48 million. Unsuccessful bidders were Bombardier, Budd, Kinki Sharyo, Mitsubishi, and Siemens-Allis. The cars will be used on a 20-mile line scheduled to go into service in 1986. It will extend from the southern residential areas of San Jose to the northern industrial parks of San Jose and the city of Santa Clara. The cars will be built at Thunder Bay, Ont., by a joint venture 80% owned by UTDC and 20% owned by Hawker Siddeley Canada.

Shintech, Inc.: Leased 50 5,800-cubic-foot-capacity covered hopper cars for plastics service from Thrall Car for delivery in November. The cars, which do not have a centersill, are equipped with Edsco Vac-U-Matic outlet valves and a new Dev-

Mark stainless steel hatch cover design.

Stroh Brewery Co.: Will place in service 50 60-foot Fruit Growers Express mechanical refrigerator cars which have been equipped by FGE with an 18,600-gallon stainless steel container for transporting liquids in a consistently temperature-controlled environment. The joint venture with FGE represents an investment of more than \$2 million by the brewer; in addition, Stroh will spend \$500,000 to construct a rail facility near its Detroit plant on Grand Trunk Western.

Vancouver Rapid Transit System: Is using two ROPCO HD 1580 Magnum Speedloaders, each with a weight capacity of 150,000 pounds, in construction of elevated lines. The Speedloaders will lift guideway beams weighing 100 metric tons each onto specially-designed trucks for transportation to the construction site. They are also being used in beam production to transport reinforcing steel and sections of the molds.

Market Indicators

DRI Railroad Industry Monitor

The government report that GNP grew at a 7.9% annual rate for the third quarter capped a month of good economic news. New car sales are moving well, consumer spending is strong, and the residential construction picture remains good despite the expected drop in housing starts.

The budget deficit and possibility of foreign loan defaults are dark clouds on the horizon, but they do not at this point seriously threaten the recovery.

For the railroads, the major piece of unsettling news is the sluggishness of the recovery in steel. During the recession the economy has seen a decline in steel intensity—the amount of steel consumed for any given level of GNP. Part of this change may simply reflect shifts in inventories and import penetration, but a real shift in the struc-

	1983:2	1983:3	1983:4	1984:1	1984:2	1984:3	1984:4
Economic Indicators (Annualized rates)							
Real GNP (% change)	9.7	7.0	5.1	4.8	4.7	4.4	3.5
Industrial Production (1967 = 1.0)	1.44	1.51	1.53	1.56	1.57	1.59	1.61
Housing Starts (mil. units)	1.68	1.83	1.72	1.89	1.74	1.79	1.80
Retail Car Sales (mil. units)	9.2	9.4	10.0	10.3	10.6	10.8	10.8
Raw Steel Production (mil. tons)	21.7	23.3	25.5	27.8	28.4	26.4	27.0
Total Class I Rail Traffic (millions of tons)							
	312.8	330.2	306.0	314.4	333.9	338.0	333.5
Key Commodities							
Grain	26.7	36.8	29.1	31.8	30.6	27.5	29.9
Coal	118.0	124.0	115.5	125.0	127.4	131.0	132.9
Pulp & paper	9.4	9.3	9.2	9.5	9.5	9.3	9.1
Chemicals	24.0	24.6	24.1	26.7	25.7	25.0	25.0
Motor Vehicles	5.3	4.7	5.3	5.2	6.0	4.8	5.5

Source: Data Resources, Inc., Oct. 24, 1983

ture of the economy appears to have taken place. As a result, the Steel Service at Data Resources has revised downward its forecast

of steel production through the end of 1984, spelling additional trouble for the roads whose traffic base is tied to steel.

Revenue freight carloadings

Commodity	Oct. 15 week	% change from 1982	Oct. 8 week	% change from 1982	Oct. 1 week	% change from 1982	Sept. 24 week	% change from 1982
Grain	32,548	61.0	35,254	65.3	28,688	20.5	29,808	98.0
Other farm products	6,117	33.6	3,825	7.5	3,941	39.4	3,992	75.5
Metallic ores	17,134	27.7	16,178	52.9	17,638	53.5	13,376	14.6
Coal	109,759	(3.1)	109,478	(1.7)	110,327	(7.7)	109,391	31.5
Crushed stone, gravel and sand	12,047	26.3	11,813	16.7	11,868	16.7	11,638	63.1
Nonmetallic minerals	14,062	41.0	11,423	14.1	13,233	32.6	13,114	68.0
Grain mill products	12,001	0.5	11,921	(0.9)	12,904	4.8	12,658	25.9
Food and kindred products	12,203	(9.9)	12,131	(9.6)	12,968	(8.6)	12,568	19.2
Primary forest products	14,543	6.0	14,612	(1.1)	15,386	0.9	14,492	30.9
Lumber and wood products (except furniture)	7,356	20.7	7,024	21.1	7,830	12.4	7,374	55.2
Pulp, paper and allied products	14,333	(5.0)	15,271	(0.3)	16,142	(0.1)	15,518	13.6
Chemicals and allied products	24,373	17.0	24,839	19.9	27,220	20.4	24,711	36.2
Petroleum products	4,539	(0.6)	4,725	4.0	4,737	(3.3)	4,902	43.1
Stone, clay and glass products	11,502	15.0	11,810	8.4	12,240	6.5	11,824	32.4
Coke	4,741	1.3	4,887	4.6	5,234	17.9	5,367	35.6
Metals and products	8,809	34.7	8,168	26.3	9,679	20.3	8,595	37.2
Motor vehicles and equipment	19,394	47.8	19,817	59.0	19,539	56.2	18,974	63.1
Waste and scrap materials	9,236	22.5	8,911	20.5	9,395	16.8	9,019	55.2
Forwarder and shipper assn. traffic	10,319	29.1	10,740	30.2	11,067	33.1	10,312	53.6
All other carloads	54,466	18.7	57,040	19.7	58,184	17.5	55,932	54.2
LCL traffic	325	(68.9)	311	(71.9)	337	(71.0)	342	(66.6)
Total Cars Loaded	399,807	13.1	400,178	13.5	408,557	9.3	393,907	41.0

Estimated revenue ton-miles (billions)
41 weeks

1983
650.4

1982
636.5

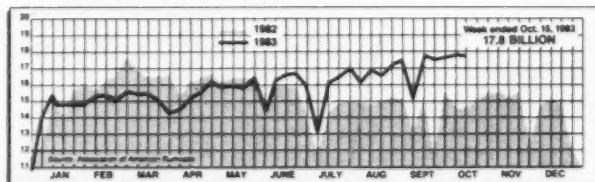
% change from 1982
2.2

Piggyback loadings

Week ended	Cars loaded 1983	% increase from 1982	Trailers/containers 1983	% increase from 1982
September 17	49,888	23.8	87,661	23.9
September 24	50,931	53.6	88,936	50.8
October 1	52,219	22.5	92,024	19.4
October 8	50,800	23.6	89,160	20.9
Cumulative total, 40 weeks	1,779,358	21.5	3,074,604	18.6

Rail freight traffic trends

Billion ton miles (Estimated)



because the subgrade drains less freely than the ballast.

And so it goes. Ballast pockets, far from representing points of strength, so weaken the subgrade as they soak it that they grow deeper and deeper, sometimes burrowing down as much as twenty feet. When water collected in the pocket freezes the result can be even more spectacular.

● **Design it right.** It doesn't have to work out that way, of course. While its practitioners must work with what at best are hardly ideal engineering materials, the principles of soil mechanics are well enough established to permit designing around most recognized problems. With appropriately different load distributions, subgrade design calculations for highways, airport runways and railroads are similar enough to support reasonably high-confidence transfer of the fruits of civil engineering training, research results and field experience among the different applications.

A good example of problems recognized and controlled is the Southern's Spencer Yard at Linwood, N.C. Constructed in 1977-79 in an area including several open backwaters and

acres of unstable native soils, and during what happened to be an extended period of unusually wet weather, the foundations for Spencer's 65 miles of track absorbed 5.6 million cubic yards of grading and several miles of drainage lines by the time the recommendations of the engineers for overcoming the physical problems of the logistically ideal site were cranked into the plans. Then came 870,000 tons of crusher-run granite as a sub-base for 225,000 tons of granite ballast, with several acres of geotextile fabric interposed in the more difficult areas for good measure.

It can be done: After four years in service, track stability remains excellent and Southern's Vice President-Engineering H.L. Rose says "the results are worth every penny we put into it."

● **Geotextiles—how do they work?** Within the last decade a lot of cloth has gone into railroad track, frequently with benefits in alleviating conditions at trouble spots more than sufficient to make up for having rug salesmen infesting the industry. How do geotextiles work? At the interface between ballast and subgrade a fabric properly chosen (this may take some doing, since there are at least

11 manufacturers in the field at the moment, some with more than one line of product) can in theory attack the problem in several ways:

Tensile strength of the fabric may improve the load-spreading properties of the ballast, increasing the effective ballast depth in terms of subgrade pressure at the interface. Filtering action of the fabric may impede migration of the subgrade into the ballast, preserving its effectiveness. The fabric itself may serve as a drain by wicking out some water from ballast and subgrade.

To accomplish these good things of course the material must survive sunlight, water, track machinery and sharp ballast to a considerable degree. As is the case with anything multipurpose—especially where some of the possible benefits are contradictory (wicking vs. filtration, for example)—it's difficult to determine exactly what combination of properties should best fill the bill in any particular situation, and the applicability or validity of test procedures for some characteristics remains to be fully established. An AREA task force is working with representatives of some of the manufacturers on this matter.

Going for geotextiles is the fact that the

Roadway train accidents—down, irregularly

The consequences of drainage problems most directly visible—in both newspapers and FRA reports—are slides, washouts and major roadbed displacements occurring just ahead of or under a train. These you can count, dissect and price out, at least in terms of damage to roadway and equipment. An uncounted number of washouts and slides are detected in time, by slide fences or other heroes, and don't show up in the accident figures; as the accompanying table indicates, those that aren't detected and do show up in

the statistics account for such a small number of reportable mishaps that their number and cost, even on a national basis, bounces around from year to year. The total cost is also, even in a relatively bad year such as 1982, modest in comparison to that of such a catastrophe of geography and weather as this May's \$40 million mud slide on the Rio Grande in Utah (RA, Sept., p. 42).

More consistent, and showing a continuing downward trend are the number and cost totals for train accidents in the "Roadbed settled

or soft" category—sudden failures, usually in fills, which are almost always associated with the presence of excess moisture somewhere in the subroadbed. Down by almost a factor of three from the 1979-80 average, 1982 damage totaled only a little over \$1 million; savings from anticipating and wiping out the causes of all of the sudden failures couldn't by itself pay for a whole lot of improved drainage.

Far more significant in total are those less direct effects of poor drainage which can occur anywhere along the railroad:

—Poor drainage results in an unstable subgrade.

—Unstable track results in poor surface, line and gauge.

—Fouled ballast pumps mud, particularly at joints, accelerating rail-end batter and loosening fastenings.

—Ties deteriorate more quickly when wet.

These roadbed-induced effects can show up as train accidents which result directly from defects within the "track geometry" category. Wide gauge from missing or defective ties, incorrect superelevation and irregular cross level are major contributors to a frequency and cost total which is also on an encouragingly downward trend, in line with the industry-wide improved track condition of recent years. However, it's apparent that these manifestations of track deterioration often properly traceable to poor drainage are right up there in total with such more often publicized track-related accident causes as rail and joint bar defects. Further reducing these could buy a lot of drainage.

Track-related accident statistics summary (U.S.)

(Number of train accidents/reportable cost, \$ million)

	1979	1980	1981	1982
Roadbed settled or soft	129/ \$2.8	111/ \$3.6	80/ \$1.9	60/ \$1.2
Washout/slide etc. track damage	64/ \$7.5	31/ \$3.2	24/ \$1.7	36/ \$9.5
Other roadbed defects	20/ \$0.6	14/ \$3.5	7/ \$0.1	13/ \$0.4
Subtotal, roadbed defects	213/ \$11.0	158/ \$10.4	111/ \$3.9	109/ \$11.1
Subtotal, track geometry defects	1,803/ \$43.5	1,575/ \$48.4	1,048/ \$33.5	751/ \$28.0
Total, defects in track, roadbed and structures	4,050/ \$110.5	3,482/ \$108.0	2,273/ \$79.9	1,768/ \$83.1

NOTE

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